Peter Tarca
General Manager
Intelligent Buildings Business Unit
PeopleCube
ptarca@peoplecube.com

Carbon Control: The Economic and Workplace Efficiency Benefits of Intelligent Building Energy Management Systems

Energy management solutions are quickly transitioning from a nice-to-have to a necessity. Given that energy is typically an organization's third highest cost after personnel and real estate, reducing energy consumption can be a highly effective tool for significantly cutting costs. While managing energy consumption is no small task, when done efficiently using the right energy management solutions, companies can eliminate unnecessary energy consumption, significantly reduce energy expenses, and cut harmful carbon emissions – all with minimal risk.

ROI of Successful Energy Management

Whether the objective is to cut energy costs, comply with government mandates, or benefit from tax incentives, implementing energy management solutions aren't just beneficial to an organization's public image, they're good for their bottom line as well.

Brandt Smith, Vice President of Industrial Energy Audit Services, defined energy management as "the process of monitoring, controlling, and conserving energy to maximize profits and minimize risk."[i] Employing an energy management system can be extremely profitable for an organization, however, it requires a form of *active* energy management. In fact, organizations have been able to cut their energy costs by 30 percent or more annually simply by actively monitoring and controlling how—and when—their energy is consumed.

The ROI involved in reducing an organization's energy consumption is often overlooked but is one of the single greatest benefits of an energy management strategy. According to Smith, "using a simple payback (project cost / annual savings) these [sustainability] projects are extremely attractive." He goes on to state that:

- 80 percent of the projects pay for themselves in a year or less
- 90 percent of the projects pay for themselves in less than 2 years
- 95 percent of the projects pay for themselves in less than 3 years

Furthermore, energy management projects often bring significant financial benefits regardless of what the economic climate of the organization may be. For example, during a strong economy, these projects enhance a company's public image while reducing the need for expansions as they tend to increase real estate utilization and efficiency. On the other hand, energy management solutions help companies maximize profitability because they help lower energy and other operational costs.

Complying with Government Regulations

Not only are companies looking to cut costs, but they are also trying to find ways to abide by existing and forthcoming government laws and regulations regarding energy management and carbon reduction. Over the past few years governments worldwide have increasingly passed legislation that encourage organizations to gain better control over their energy consumption, and this trend will undoubtedly continue. In other instances, incentives are being offered in the form of rebates and tax credits to those businesses investing in energy management initiatives. These incentives can vary based on location but often result in significant savings. One example of this is the national "Better Buildings Initiative" in the United States that currently offers commercial building owners a tax deduction for energy efficiency upgrades with the goal to make commercial buildings 20% more energy efficient over the next decade through cost-effective upgrades.

Also in the U.S., the Federal Government is taking action on its own behalf to reduce its energy consumption and has begun to implement changes within their own buildings. In 2010 President Obama signed a memorandum to dispose of unneeded federal real estate in hopes of increasing sales proceeds, cutting operating costs, and improving energy efficiency. The main goal of the memorandum is "to eliminate wasteful spending of taxpayer dollars, save energy and water, and further reduce greenhouse gas pollution." It states that "in total, agency efforts required by this memorandum should produce no less than $3 billion in cost savings by the end of fiscal year 2012. This is in addition to the Department of Defense's Base Realignment and Closure efforts that are expected to achieve $9.8 billion in savings from fiscal year 2010 to fiscal year 2012, of which $5 billion is a direct result of reduced operating and maintenance from disposals or other consolidation efforts."

On a more micro level, state governments have also been taking action to require organizations to control their own carbon emissions. For example, California has recently passed the Green Building Standards Code (CALGREEN), which requires all new buildings within the state of California to be more energy efficient and environmentally responsible. The goal is to attain significant reductions in energy consumption, carbon emissions, and water use to create a "greener" California. These codes, including mandatory inspections of energy systems for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies, will be enforced in every new building constructed in the state. In another example, according to the New York Times[ii], Massachusetts is one of ten states participating in the Regional Greenhouse Gas Initiative, a cap-and-trade system for electric utilities that is designed to curb heat-trapping gases.

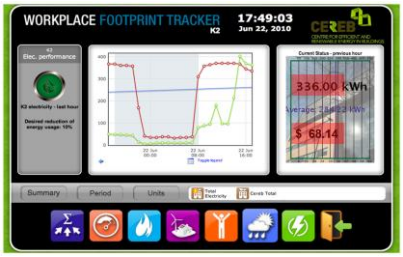
The most efficient way businesses can conform to these sustainable initiatives is by implementing an energy management solution that will show them when and where they are consuming electricity and other energy sources excessively, and then employ systems to automatically control when and how the energy is being used. This will enable organizations to not only comply with these federal and local government mandates, it will also result in greater operational efficiency and significant cost-savings.

Measure & Visualize Consumption

The economic benefits of knowing when, where, and for how long energy is being consumed throughout an organization cannot be overstated. According to Stephen Stokes, VP and distinguished analyst at research firm Gartner, “some of the lowest of the low-hanging, energy-efficient fruit can be found in the energy footprint of buildings. It has been estimated that they are the single-largest consumer of electricity globally, and about 40 percent of this energy consumption can be removed by implementing existing and mature efficient technologies as well as operating and information technologies.”[iii]

Without having visibility into the energy consumption trends that are taking place within their own facilities, companies simply cannot take corrective measures to mitigate any inefficiencies that may be taking place. The most effective energy management solutions provide real-time energy consumption data using interactive dashboards. These dashboards provide the type of critical energy consumption information that allows companies to:

- Identify what areas of the building are consuming the most energy
- Analyze how much energy is being consumed during a given time period
- Uncover trends in energy consumption
- Pinpoint inefficiencies to help better control how the organization is managing its carbon output
- Benchmark actual consumption against targeted goals



Energy Management Dashboard

Monitor & Control Energy Use

Visibility into energy consumption is certainly one important piece of the energy management puzzle, but what you do with that information is where the real economic benefits derive from.

In addition to 40 percent of energy consumption being wasted in buildings, real estate experts claim that 30-40 percent of commercial real estate typically goes unused at any particular time as well.

The economic impact of this combined inefficient utilization of energy and real estate cannot be overstated, and emphasizes the importance of implementing an advanced energy management solution. These systems must provide automated active control over the amount of energy that is consumed in nearly any area of a facility. By integrating workspace management software with Building Management Systems (BMS), the energy consumption of a meeting room, office, or other workspace is dictated by the schedule of the room. For example, rather than maintaining a consistent temperature of a conference room regardless of whether it’s being used or not, the workspace management system will communicate the room schedule to the BMS and the climate will automatically adjust to comfortable levels during its planned use. By eliminating this type of inefficient energy consumption, companies have seen 40 percent savings in their annual energy costs.

Intelligent Space Utilization with Space Hibernation

Another emerging trend in energy management is the concept of space hibernation. Given the low levels of actual space utilization worldwide, companies are turning to these intelligent energy management systems to actively manage space utilization to help cut their energy costs. For example, a conference room on the 10th floor may be available for someone looking for a 20-person room from 11:00 to 12:00. However, the system will automatically detect that this is the only reservation for that room on the 10th floor yet there is a similar room available on the eighth floor at the same time that is also being used from 9:00 to 11:00 and 1:00 to 3:00. The system will then know to automatically "hibernate" the room on the 10th floor, rendering it unavailable, and will force the reservation to the eighth floor. As a result, rather than heating/cooling both rooms throughout the entire day, only the room on the eighth floor is consuming energy while the room on the 10th floor remains dormant. In this simple scenario, you've just cut the energy consumption in half.

A telework environment is also a great example of where space hibernation can play an important role in cost reductions. Obviously a mobile worker needs a workspace when they are in the office, however, through occupancy detection and other space utilization analysis, you may uncover that the maximum capacity of your workspace is only 70 percent on any given day. You can configure the workspace management system to divide the reservable workspace into sub-sections based on the various heating zones and hibernate all sections except for one. As the teleworkers make their space reservations for that day, only when the first section reaches maximum capacity will the reservation system open the next section. As a result, rather than heating/cooling the entire floor, you're only consuming (and paying) for the space that is actually going to be used.

All over the world, companies are quickly realizing the significant benefits that can result by implementing energy management solutions. In fact, Gartner predicts that "by 2015, improving sustainability [will] become a top five priority for 60 percent of major Western European and North American CEOs."[iv] With these solutions and the growing concern to integrate them into their workplace framework, organizations can not only enhance their public image while complying with government regulations, they can also significantly improve workplace efficiency while curring energy costs. And with results like that, it's a win-win for the environment *and* your bottom line.

---

[i] Brandt Smith, "Growing Your Bottom Line Through Energy Management" IndustryWeek, April 6, 2011

[ii] Felicity Barringer, "Massachusetts Sets Targets to Slash Carbon Emissions" The New York Times, December 29, 2011

[iii] Stephen Stokes and Simon Mingay, "*Hype Cycle for Sustainability and Green IT, 2010: Facilities Energy Management," Gartner, Inc. July 29, 2010*

[iv] Simon Mingay, Stephen Stokes, Keith Harrison, Zarko Sumic, and Bettina Tratz-Ryan, "*Predicts 2011: Sustainability Facing a Long Path to Fruition," Gartner, Inc. November 18, 2010*